# TRI-AGENCY FORECAST DISCUSSION FOR JULY 23, 2010

Tropical Areas of Interest Discussion: Created 1800 UTC July 23, 2010

Andrew Martin and Cerese Inglish

**Summary:** At 2215 UTC yesterday, Tropical Depression 3 was upgraded to Tropical Storm Bonnie by the NHC. This is the second named storm of the Atlantic hurricane season. Bonnie made landfall near Biscayne National Park, FL today around 1400 UTC, and will emerge weaker into the Gulf of Mexico late this afternoon after a short trek across the Everglades, which has not been kind to the storm. Flights by multiple agencies are planned to investigate Bonnie tomorrow. The upper level cold low which has played such a large role in Bonnie's life cycle thus far has continued to move westward, and is now located in the northwestern Gulf of Mexico. Elsewhere in the Tropics, there are two easterly waves in the eastern Atlantic, AL98 has moved inland into Mexico, and the subtropical high has retreated eastward, allowing a front associated with a mid-latitude low located near Newfoundland to dive south to near 30 N.

**Forecast: 1800 UTC July 23, 2010**

In the PREDICT/GRIP/IFEX domain the features of note are Tropical Storm Bonnie, two easterly waves, an upper level cold low, a cold front in the northwest Atlantic, and the remnants of AL98 which is now over Mexico. Most tri-agency focus is on Bonnie, thus other features will be briefly mentioned. A tropical wave (ex-PGI18L) is located near 53W from 18N to 8N. This wave is producing some localized shower activity at its northern extent along with some enhancement of convection in the ITCZ. A tropical wave is located from 30W, 16N to 35W, 8N and is currently being tracked by the Montgomery group as PGI-19L. This wave was producing scattered shower activity early this morning, but is well beyond the domain of PREDICT/GRIP/IFEX. PGI-16L/AL98 moved inland over Mexico without further development and is dissipating. The upper level cold low which has influenced so much of Bonnie's development is now over the central Gulf of Mexico, and can clearly be seen on water vapor imagery (*see **3***). The upper level flow associated with this low is creating upper convergence near it, and sinking motion over most of the rest of the Gulf of Mexico is inhibiting shower activity. The final feature of note is a cold front entering the north Atlantic from the US east coast. The subtropical ridge which had dominated the area for the last week has moved east, allowing the front to dive nearly to 30 N. This front is not affecting any systems currently of interest to tri-agency scientists, but is of note as it represents a break in the wide-scale pattern of the north Atlantic (*see **1***).

Tropical Storm Bonnie was located near 80W, 25N as of the 11AM EDT (1500 UTC) NHC advisory. Maximum sustained winds were measured at 40mph with a minimum central pressure of 1008 hPa. The storm is moving on a heading of 295 degrees at 16 mph. Bonnie contains a very small area of deep convection, which is currently located very near, but east of the surface center of circulation, as can be seen from radar imagery (*see **7***). Bonnie is located in a pocket of high total precipitable water, but dry air is encroaching from both the east and west. (*see **3***) The upper level low which has been associated with Bonnie for the storm's entire life cycle is drying the atmosphere over the Gulf and the southern Atlantic US. In fact, Bonnie contains the major source of moisture currently entraining into the much larger upper level feature. Bonnie continues to draw from the very moist environment to its SE, but as it moves (according to track guidance) WNW over the next 24-48 hours it may become separated from its primary moisture source. Upper-level divergence over Bonnie is not particularly strong for a

tropical storm, with maximum values just above 10 s^-1 according to analysis from CIMSS satellite winds (*see **4b***). These weak values may be due to the broad-scale upper confluence over the Gulf of Mexico extending east to the Bahamas due to the cold low over the Gulf. Bonnie continues to be located in a relative shear minima between the shear zone of the upper level low to its west, and the northerly shear associated with an upper level ridge to Bonnie's northeast. There has been some discussion recently about how small storms like Bonnie can tend to be enhanced by a proper separation from an upper level low ahead of it and to its northwest. This is only true for a certain distance, closer than which shear associated with a TUTT can impede a storm, and further than which a TUTT has little influence. It is the opinion of the forecasters that in the life cycle of TD3/Bonnie, the system was initially hampered by the location of the TUTT, but then became enhanced by downstream ridging and a relative minima in shear, when a proper separation from the TUTT occurred yesterday as the upper level cold low moved more quickly to the west than TD3. This allowed for brief intensification of the storm where repeated reconnaissance eventually found tropical storm force sustained maximum winds.

However today, the shear over Bonnie has become easterly with magnitudes near 17 kts (*see **4a***) and is forecast by the GFS model to remain moderate over the next 36 hours, becoming lower as the system approaches a second landfall near 48 hours. Model guidance forecasts small changes in Bonnie's heading over 48 hours (*see **5a***). The official forecast from NHC takes Bonnie into the east-central GOM by 1200 UTC Saturday, before a slight northward turn should result in Bonnie's second landfall as a Tropical Storm by early Sunday morning (*see **6***). Today we see that the intensity forecasts continue to differ between the dynamical and statistical-dynamical models once again. As of the 1200 UTC initializations, the HWRF, GFDL and other full-physics models weaken Bonnie immediately into a remnant low. The SHIPS, DSHIPS and others in the statistical-dynamical class have Bonnie slightly strengthening but maintaining Tropical Storm strength until landfall (*see **5b***). This is closer to the NHC official forecast. Both NOAA and NASA aircraft have planned flight investigations into Bonnie for Saturday morning and again in the afternoon. As Bonnie emerges near Naples, FL this afternoon, tropical storm force winds should persist, with a limited area of deep convection and thunderstorm activity in small rainbands. Gulf waters are certainly warm enough to support further development. However, due a few limiting factors such as available moisture supply at critical levels, lessened organization as it emerges back over water, and unfavorable wind shear as previously discussed, Bonnie is not expected to intensify much beyond its current state and is forecasted to remain a Tropical Storm with a minimum sea-level pressure near 1005 hPa with maximum sustained winds near 40-45 kts throughout Saturday and into early Sunday.

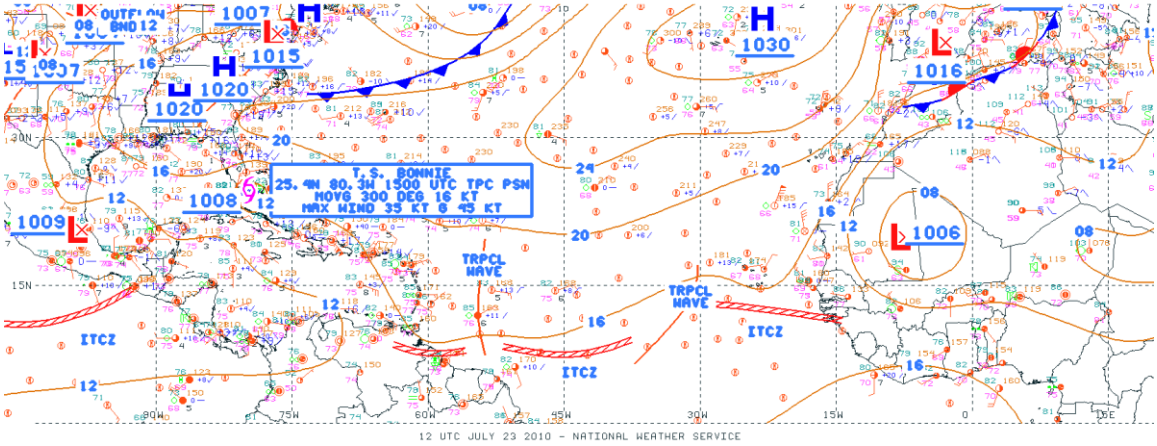
# Links to resources used in discussion:

**1: Updated 1200 UTC TPC analysis http://www.nhc.noaa.gov/tafb/ATSA_12Z.gif**
**2: GOES-E Floater IR Bonnie: http://www.ssd.noaa.gov/goes/flt/t1/rb-l.jpg**
**3: GOES-E NW Atlantic View of Water Vapor: http://www.ssd.noaa.gov/goes/east/nwatl/wv-l.jpg**
**4a and b: CIMSS shear and upper divergence products:**
**http://cimss.ssec.wisc.edu/tropic2/real-time/windmain.php?&basin=atlantic&sat=wg8&prod=shr&zoom=&time=**

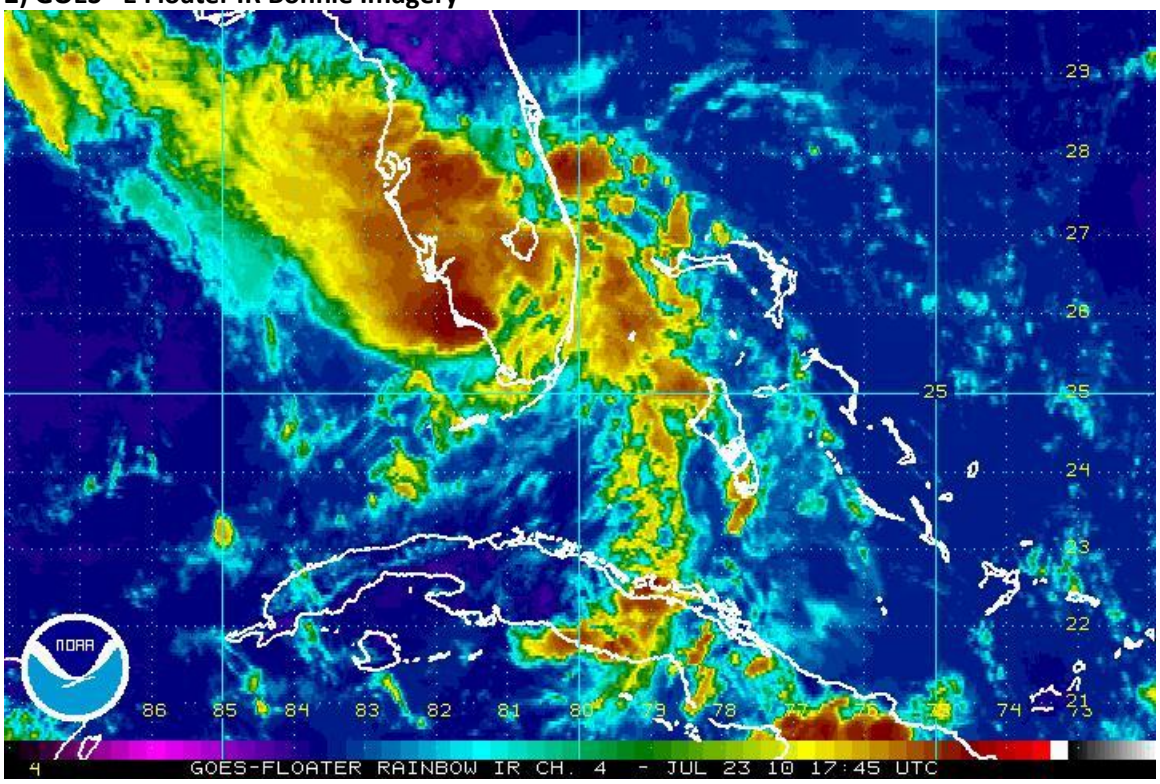
**5a and b: CSU Model Track and Intensity Guidance from 1200 UTC:**
**http://euler.atmos.colostate.edu/~vigh/guidance/**
**6: 3-Day forecast of track from NHC at 2PM EDT (1800 UTC):**
**http://www.nhc.noaa.gov/refresh/graphics_at3+shtml/145015.shtml?5-daynl#contents**
**7: 2PM (1800 UTC) Miami WSR-88D image:**
**http://radar.weather.gov/radar.php?rid=amx&product=N0R&overlay=11101111&loop=no**

# Static Images used in discussion:

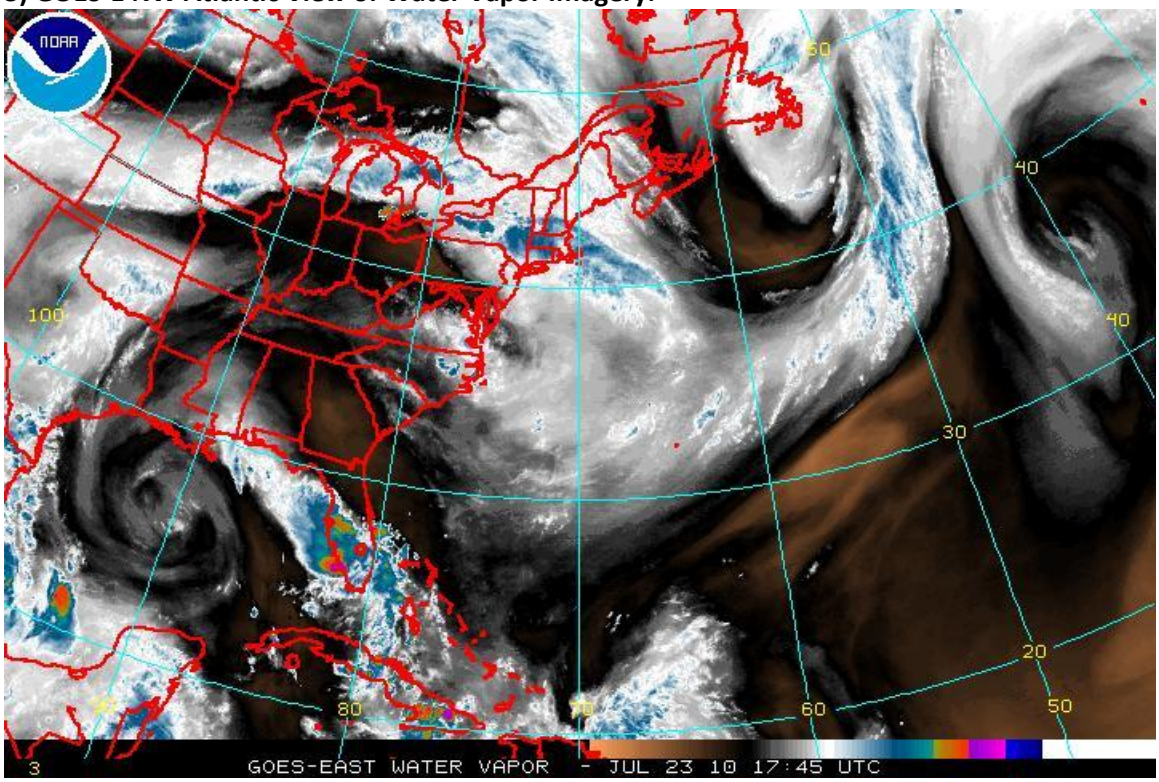
1) **Updated 1200 UTC TPC analysis**



**2) GOES –E Floater IR Bonnie Imagery**

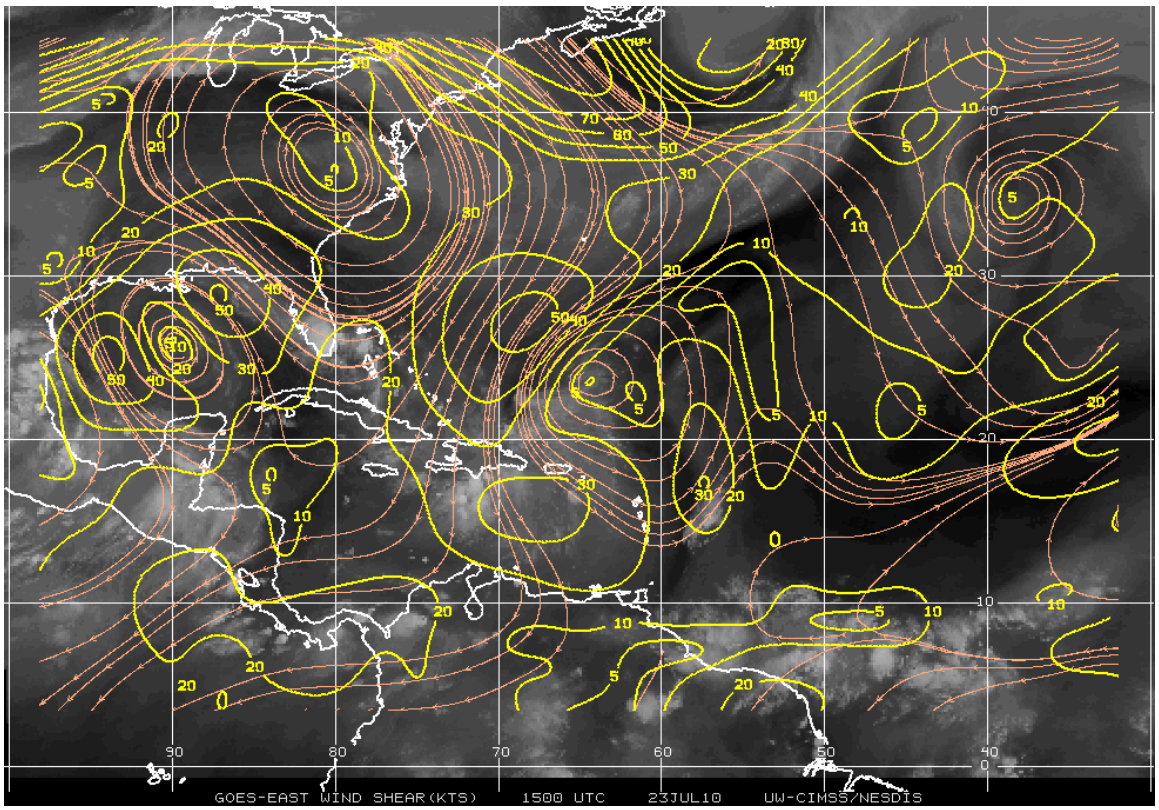



**3) GOES-E NW Atlantic View of Water Vapor Imagery:**

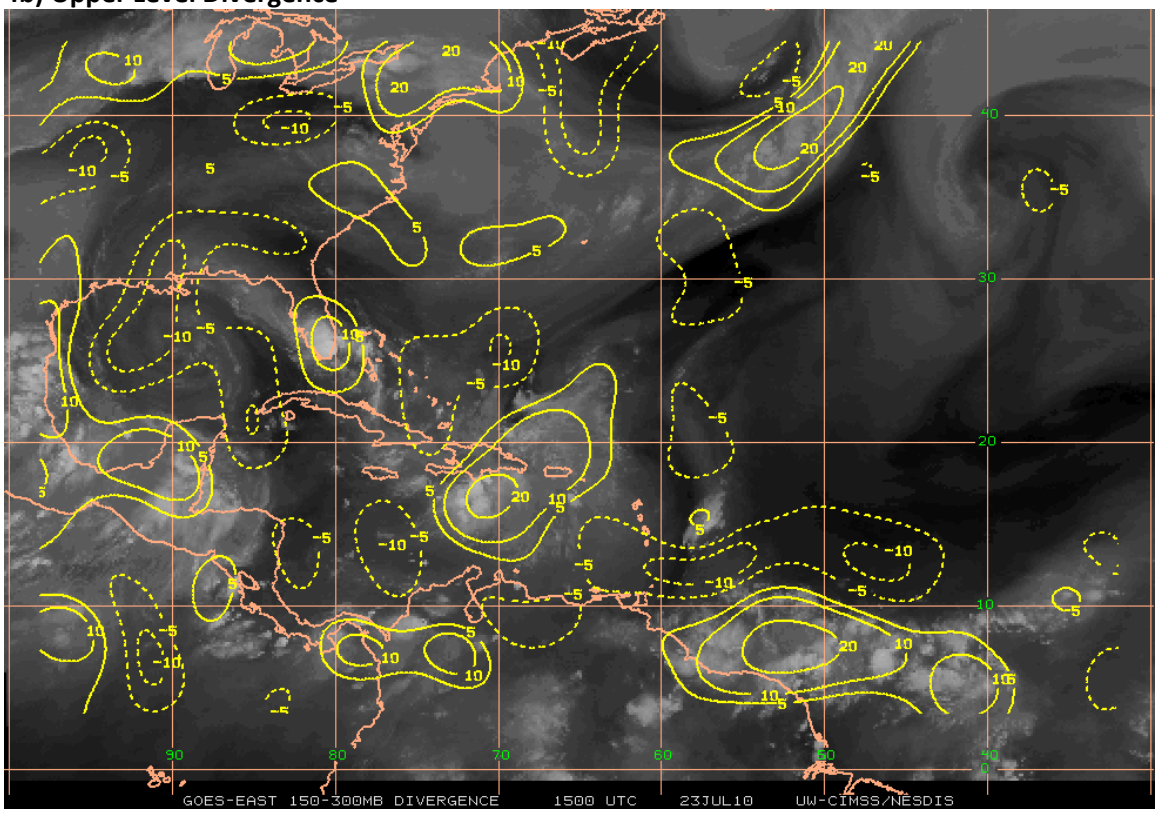



**4a) CIMSS Shear**

**and**




**4b) Upper Level Divergence**

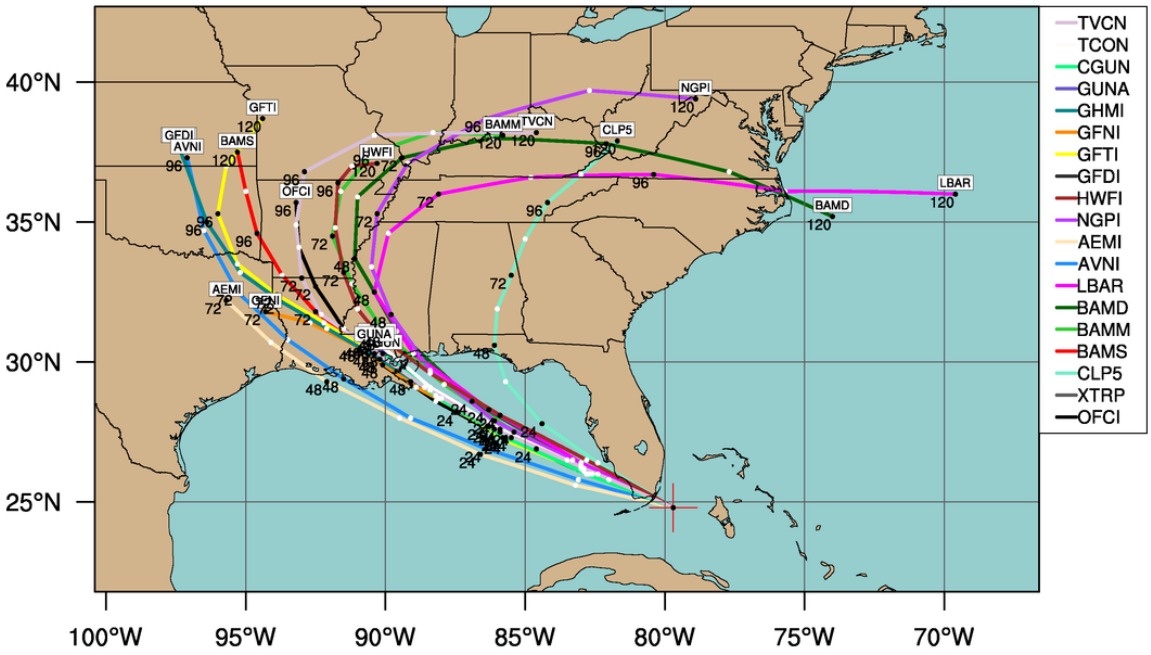


5a)

# TROPICAL STORM BONNIE (AL03)

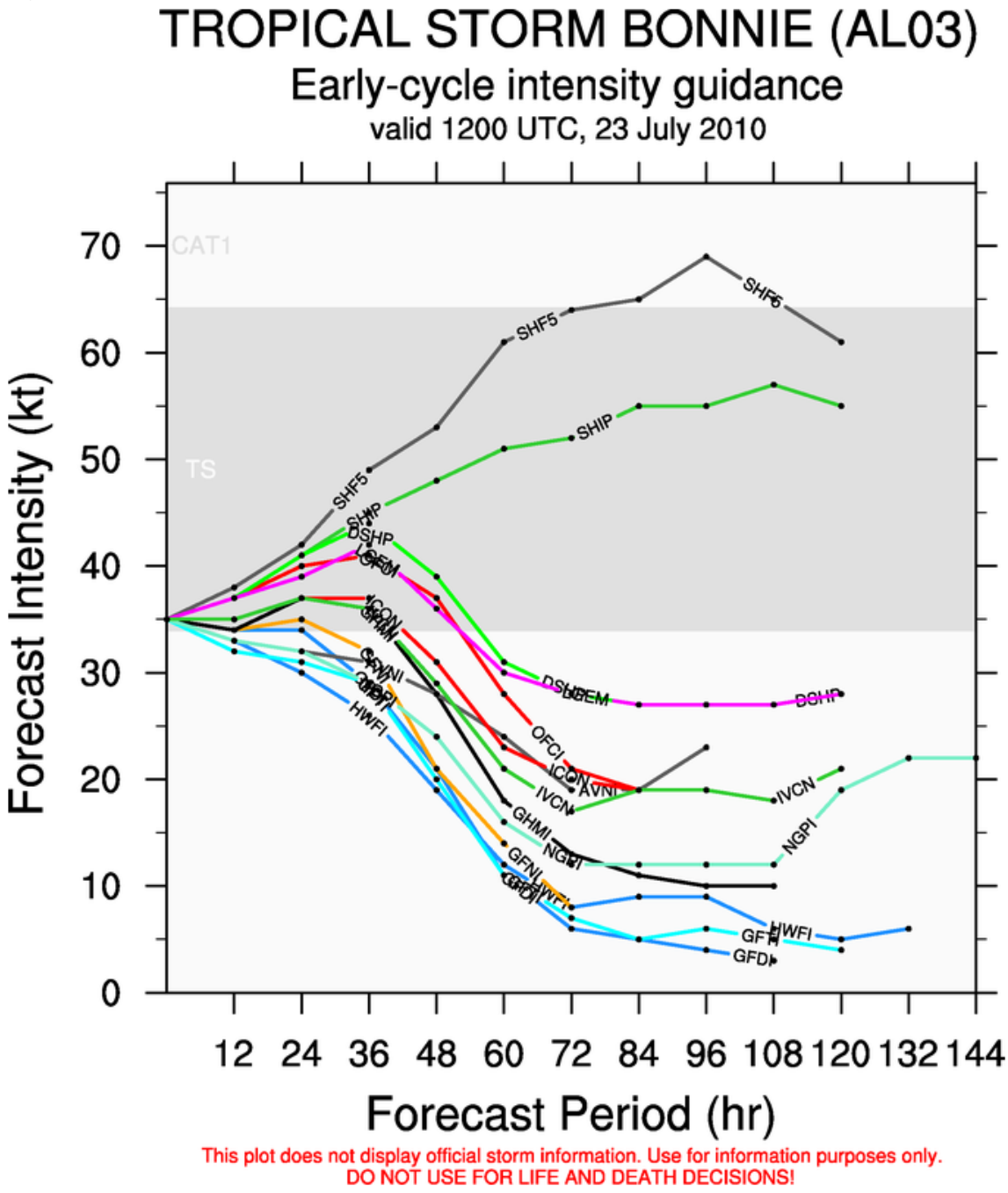
## Early-cycle track guidance valid 1200 UTC, 23 July 2010

Current Intensity: 35 kt  Current Basin: North Atlantic

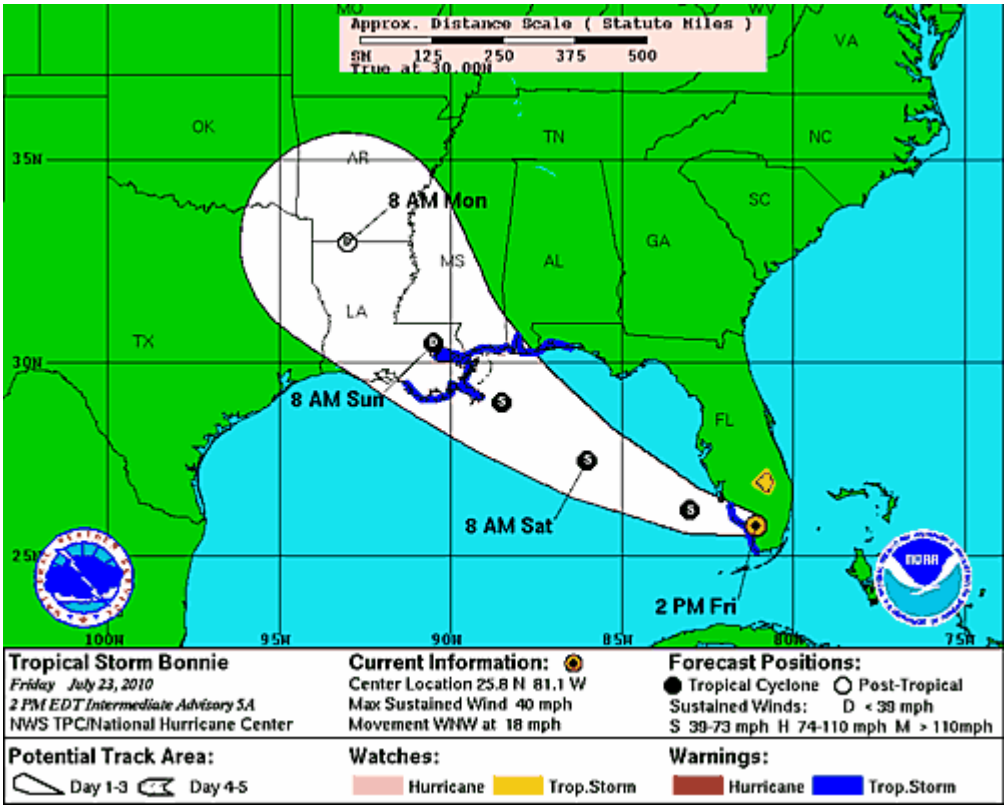



This plot does not display official storm information. Use for information purposes only.
DO NOT USE FOR LIFE AND DEATH DECISIONS!

5b)


TROPICAL STORM BONNIE (AL03)
Early-cycle intensity guidance
valid 1200 UTC, 23 July 2010
CAT1
TS
Forecast Intensity (kt)
0
10
20
30
40
50
60
70
12 24 36 48 60 72 84 96 108 120 132 144
Forecast Period (hr)
SHF5
SHIP
DSHP
LGEM
ICON
IVCN
NGPI
HWFI
GFDI
OFCI
GHMI
This plot does not display official storm information. Use for information purposes only.
DO NOT USE FOR LIFE AND DEATH DECISIONS!

6)


Approx. Distance Scale ( Statute Miles )
0N 125 250 375 500
True at 30.0ON
OK
AR
TN
NC
VA
SC
GA
AL
MS
LA
TX
FL
35N
30N
25N
100W
95W
90W
85W
80W
75W
8 AM Mon
8 AM Sun
8 AM Sat
2 PM Fri
Tropical Storm Bonnie
Friday July 23, 2010
2 PM EDT Intermediate Advisory 5A
NWS TPC/National Hurricane Center
Current Information:
Center Location 25.8 N 81.1 W
Max Sustained Wind 40 mph
Movement WNW at 18 mph
Forecast Positions:
Tropical Cyclone
Post-Tropical
Sustained Winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110mph
Potential Track Area:
Day 1-3
Day 4-5
Watches:
Hurricane
Trop.Storm
Warnings:
Hurricane
Trop.Storm

## 7) 2PM EDT (1800 UTC) Miami WSR-88D radar image